AMENDMENTS TO THE CLAIMS

This listing of claims will replace all prior versions of claims in the application:

Listing of Claims:

1. (Currently Amended) A computer-implemented method comprising:

allocating each of a plurality of ads to at least one of a plurality of clusters, based on a predetermined criterion accounting for at least a quota for each ad and a constraint for each cluster;

selecting an ad for a current cluster from ads allocated to the current cluster; ~~and,~~and

effecting the ad, the predetermined criterion increases an actuation occurrence of the effected ad.

2. (Previously Presented) The method of claim 1, effecting the ad comprises displaying the ad.

3. (Cancelled).

4. (Currently Amended) The method of claim 2, the predetermined criterion further accounts for a particular one of the plurality of ads restricted from being shown in a particular one or more of the plurality of clusters.

5. (Previously Presented) The method of claim 2, the predetermined criterion comprises maximizing an expression $\sum_{ij} p_{ij}x_{ij}$, where p_{ij} comprises a probability that a user in cluster j will actuate ad i.

6. (Previously Presented) The method of claim 5, the predetermined criterion further comprises maximizing the expression subject to a constraint $\sum_j x_{ij} = q_i$, where q_i comprises a quota for ad *i*, and x_{ij} comprises a total number of times ad *i* is shown in cluster *j*.

7. (Previously Presented) The method of claim 5, the predetermined criterion further comprises maximizing the expression subject to a constraint $\sum_i x_{ij} = c_j$, where c_j, comprises a constraint for cluster *j*, and x_{ij} comprises a total number of times ad *i* is shown in cluster *j*.

8. (Previously Presented) The method of claim 5, the predetermined criterion comprises maximizing the expression subject to a first constraint $\sum_j x_{ij} = q_i$, where q_i comprises a quota for ad *i*, and x_{ij} comprises a total number of times ad *i* is shown in cluster *j*, and a second constraint $\sum_i x_{ij} = c_j$, where c_j comprises a constraint for cluster *j*, and x_{ij} comprises a total number of times ad *i* is shown in cluster *j*, such that the expression, the first constraint and the second constraint define a linear program.

9. (Previously Presented) The method of claim 8, the linear program is solved by the Simplex Algorithm.

10. (Previously Presented) The method of claim 2, allocating each of a plurality of ads to at least one of the plurality of clusters comprises determining for each ad in each cluster a probability that a user in the cluster will actuate the ad.

11. (Previously Presented) The method of claim 10, the probability that a user in the cluster will actuate the ad comprises the probability that a user in the cluster will click on the ad.

12. (Previously Presented) The method of claim 10, determining for each ad in each cluster a probability that a user in the cluster will actuate the ad comprises inputting training data from which to determine for each ad in each cluster the probability that a user in the cluster will

actuate the ad.

13. (Previously Presented) The method of claim 10, determining for each ad in each cluster a probability that a user in the cluster will actuate the ad comprises utilizing at least one of: a maximum likelihood approach, a MAP method approach, and, a hierarchical Bayesian approach.

14. (Previously Presented) The method of claim 2, the predetermined criterion comprises maximizing an expected number of actuations of the plurality of ads, given the quota for each ad and the constraint for each cluster.

15. (Previously Presented) The method of claim 2, the constraint for each cluster comprises a total number of times the cluster is visited by any user.

16. (Previously Presented) The method of claim 2, the quota for each ad comprises a total number of times that the ad must be displayed.

17. (Previously Presented) The method of claim 2, the criterion comprises favoring at least one ad over other ads within the plurality of ads in allocating the at least one ad.

18. (Previously Presented) The method of claim 2, the criterion comprises accounting for at least one house ad.

19. (Previously Presented) The method of claim 2, the predetermined criterion comprises minimizing an expression $\sum_{ij} p_{ij}x_{ij}$, where p_{ij} comprises a probability that a user in cluster *j* will actuate ad *i*.

20. (Previously Presented) The method of claim 2, the predetermined criterion comprises maximizing an expression $\sum_{ij} \alpha_i p_{ij} x_{ij}$, where p_{ij} comprises a probability that a user in cluster *j* will actuate ad *i*, and α_i comprises a coefficient for the ad *i* to indicate weighting of the ad *i*.

21. (Previously Presented) The method of claim 5, the predetermined criterion further comprises maximizing the expression subject to a constraint $x_{ij} = 0$ for a particular ad i within a particular cluster j, where x_{ij} comprises a total number of times the ad i is shown in the cluster j.

22. (Previously Presented) The method of claim 5, the predetermined criterion further comprises maximizing the expression subject to a constraint $\sum_i x_{ij} \leq c_j$, where c_j comprises a constraint for cluster j, and x_{ij} comprises a total number of times ad i is shown in cluster j.

23. (Previously Presented) The method of claim 10, the probability that a user in the cluster will actuate the ad comprises the probability that a user in the cluster will make a purchase based on the ad.

24. (Previously Presented) The method of claim 2, the method includes first initially defining the plurality of clusters.

25. (Previously Presented) The method of claim 24, defining the plurality of clusters comprises utilizing user information obtained without monitoring.

26. (Previously Presented) The method of claim 24, utilizing user information obtained without monitoring comprises utilizing a category tag (e.g., page group) of the page on which the ad is to be displayed.

27. (Previously Presented) The method of claim 25, utilizing user information obtained without monitoring comprises utilizing user information obtained from the user via a questionnaire.

28. (Previously Presented) The method of claim 24, defining the plurality of clusters comprises utilizing a preexisting plurality of groups as the plurality of clusters.

29. (Previously Presented) The method of claim 24, defining the plurality of clusters comprises utilizing a Bayesian network.

30. (Previously Presented) The method of claim 24, defining the plurality of clusters comprises utilizing a naïve-Bayes-network clustering approach.

31. (Previously Presented) The method of claim 30, utilizing a Bayesian network clustering approach comprises utilizing a bottleneck architecture.

32. (Previously Presented) The method of claim 30, utilizing a Bayesian network clustering approach comprises utilizing a bottleneck architecture recursively to construct a hierarchy of clusters.

33. (Previously Presented) The method of claim 30, utilizing a Bayesian network clustering approach comprises training a Bayesian network using a stochastic gradient descent technique.

34. (Previously Presented) The method of claim 30, utilizing a Bayesian network clustering approach comprises employing a single hidden variable having a plurality of values.

35. (Previously Presented) The method of claim 30, utilizing a Bayesian network clustering approach comprises employing a plurality of hidden variables, each having two values.

36. (Currently Amended) A computer-implemented method comprising:

defining a plurality of clusters, each cluster corresponding to a group of users who are most receptive to a given type of ad, defining the plurality of clusters comprises utilizing one of:

user information obtained without monitoring;

a Bayesian network; or

a naïve-Bayes-network clustering approach; ~~and,~~

allocating an ad having a particular type to at least one cluster based on the particular type of the ad and based on a predetermined criterion to maximize the number of click throughs of the allocated ad; and

outputting the allocated ad to the group of users.

37. (Cancelled).

38. (Previously Presented) The method of claim 36, utilizing user information obtained without monitoring comprises utilizing user information obtained from the user via a questionnaire.

39. (Cancelled).

40. (Cancelled).

41. (Previously Presented) The method of claim 36, utilizing a Bayesian network clustering approach comprises utilizing a bottleneck architecture.

42. (Previously Presented) The method of claim 36, utilizing a Bayesian network clustering approach comprises utilizing a hierarchical bottleneck architecture.

43. (Previously Presented) The method of claim 36, utilizing a Bayesian network clustering approach comprises training a Bayesian network using a stochastic gradient descent technique.

44. (Previously Presented) The method of claim 36, utilizing a Bayesian network clustering approach comprises employing a single hidden variable having a plurality of values.

45. (Previously Presented) The method of claim 36, utilizing a Bayesian network clustering approach comprises employing a plurality of hidden variables, each having two values.

46. (Currently Amended) A computer-implemented method comprising:

determining an allocation for each of a plurality of ads to at least one of a plurality of clusters, given a constraint $\sum_j x_{ij} = q_i$, where q_i comprises a quota for ad i, and x_{ij} comprises a

total number of times ad *i* is shown in cluster *j*; ~~and,~~ and

outputting the allocation of each ad to at least one of the plurality of clusters, the allocation provides a preference to at least one of the plurality of ads.

47. (Previously Presented) The method of claim 46, determining an allocation for each of a plurality of ads to at least one of the plurality of clusters comprises maximizing an expression $\sum_{ij} p_{ij}x_{ij}$, where p_{ij} comprises a probability that a user in cluster *j* will actuate ad *i*, given the constraint.

48. (Previously Presented) The method of claim 46, determining an allocation for each of a plurality of ads to at least one of the plurality of clusters comprises determining the allocation for each of the plurality of ads to at least one of the plurality of clusters further given a constraint $\sum_{i} x_{ij} = c_j$, where c_j comprises a constraint for cluster *j*, and x_{ij} comprises a total number of times ad *i* is shown in cluster *j*.

49. (Original) The method of claim 46, further comprising:

selecting an ad for a current cluster from the allocation of each ad to the current cluster; and,

displaying the ad.

50. (Currently Amended) A computerized system comprising:

a database storing a plurality of ads, each ad having an item purchase quota;

an allocator to allocate each of the plurality of ads to at least one of a plurality of clusters, based on a predetermined criterion accounting for at least the item purchase quota for each ad and a constraint for each cluster; and,

a communicator to select an ad for a current cluster from ads allocated to the current cluster and output the ad to a user.

51. (Previously Presented) The system of claim 50, at least one of the allocator and the communicator comprises a computer program executed from a computer-readable medium by a processor.

52. (Previously Presented) The system of claim 50, the database is stored as data on a computer-readable medium.

53. (Currently Amended) A machine-readable medium having instructions stored thereon for execution by a processor to perform a method comprising:

allocating each of a plurality of ads to at least one of a plurality of clusters, based on a predetermined criterion accounting for at least a quota for each ad and a constraint for each cluster, the quota for each ad is an ad display quota;

selecting an ad for a current cluster from ads allocated to the current cluster; ~~and,~~ and

displaying the ad to achieve the ad display quota.

54. (Previously Presented) The medium of claim 53, the predetermined criterion comprises maximizing an expression $\sum_{ij} p_{ij}x_{ij}$, where p_{ij} comprises a probability that a user in cluster j will actuate ad I

55. (Previously Presented) The medium of claim 54, the predetermined criterion further comprises maximizing the expression subject to a constraint $\sum_{j} x_{ij} = q_i$, where q_i comprises a quota for ad i, and x_{ij} comprises a total number of times ad i is shown in cluster j.

56. (Previously Presented) The medium of claim 54, the predetermined criterion further comprises maximizing the expression subject to a constraint $\sum_{i} x_{ij} = c_j$, where c_j comprises a constraint for cluster j, and x_{ij} comprises a total number of times ad i is shown in cluster j.

57. (Previously Presented) The medium of claim 53, allocating each of a plurality of ads to at least one of the plurality of clusters comprises determining for each ad in each cluster a

probability that a user in the cluster will actuate the ad.

58. (Previously Presented) The medium of claim 53, the predetermined criterion comprises maximizing an expected number of actuations of the plurality of ads, given the quota for each ad and the constraint for each cluster.

59. (Currently Amended) A machine-readable medium having instructions stored thereon for execution by a processor to perform a method comprising:

determining an allocation for each of a plurality of ads to at least one of a plurality of clusters, given a constraint $\sum_j x_{ij} = q_i$, where q_i comprises a quota for ad i, and x_{ij} comprises a total number of times ad i is shown in cluster j; ~~and,~~ and

outputting the allocation of each ad to at least one of the plurality of clusters, the allocation provides a preference to at least one of the plurality of ads.

60. (Previously Presented) The medium of claim 59, determining an allocation for each of a plurality of ads to at least one of the plurality of clusters comprises maximizing an expression $\sum_{ij} p_{ij} x_{ij}$, where p_{ij} comprises a probability that a user in cluster j will actuate ad i, given the constraint.

61. (Previously Presented) The medium of claim 59, determining an allocation for each of a plurality of ads to at least one of the plurality of clusters comprises determining the allocation for each of the plurality of ads to at least one of the plurality of clusters further given a constraint $\sum_i x_{ij} = c_j$, where c_j comprises a constraint for cluster j, and x_{ij} comprises a total number of times ad i is shown in cluster j.

62. (Currently Amended) A computer-implemented method comprising:

applying each of at least one first ~~ad~~item to an ordered set of rules, each rule accounting for ~~at least~~ a click-through rate quota for each of a plurality of ~~second~~ ads, to determine an ~~second~~ ad for each of the at least one first ~~ad~~item; ~~and,~~ and

effecting the ~~second~~ ad for each of the at least one first ~~ad~~item to achieve the click-through rate quota.

63. (Currently Amended) The method of claim 62, each first ~~ad~~item comprises at least information about a user, and a web page currently being browsed by the user.

64. (Currently Amended) The method of claim 62, effecting the ~~second~~ ad comprises displaying the ad.

65. (Previously Presented) The method of claim 62, further comprising generating the ordered set of rules based on training data.

66. (Currently Amended) The method of claim 65, generating the ordered set of rules comprises:

determining at least one significant correlation between a plurality of binary features of the training data and a plurality of activations of ~~second~~ ads of the training data;

determining an ~~second~~ ad and at least one binary feature providing a largest activation; and,

generating a rule based on the ~~second~~ ad and the at least one binary feature providing the largest activation.

67. (Previously Presented) The method of claim 66, generating the ordered set of rules further comprises:

removing records from the training data matching the rule generated; and,

repeating to generate another, lower-ordered rule while at least one significant correlation still exists.

68. (Previously Presented) The method of claim 66, determining at least one significant correlation comprises utilizing one of: Chi-squared method, Fisher exact test method, and Bayesian model selection method.

69. (Currently Amended) A computer-implemented method for inventory management comprising:

determining at least one significant correlation between a plurality of binary features of ~~the~~ training data and a plurality of activation of ~~ads~~items from the training data;

determining an ad and at least one binary feature providing a largest activation, each rule accounting for at least a quota for the ~~ad~~item;

generating a rule based on the ad and the at least one binary feature providing the largest activation;

removing records from the training data matching the rule generated; ~~and,~~ and

repeating to generate another, lower-ordered rule while at least one significant correlation still exists.

70. (Previously Presented) The method of claim 69, each ad comprises an ad.

71. (Currently Amended) A machine-readable medium having instructions stored thereon for execution by a processor to perform a method comprising:

applying each of at least one first ~~ad~~item to an ordered set of rules, each rule accounting for at least a quota for each of a plurality of second ~~ads~~items, to determine a second ~~ad~~item for each of the at least one first ~~ad~~item; and,

effecting the second ~~ad~~item for each of the at least one first ~~ad~~item.

72. (Previously Presented) The medium of claim 71, the method further comprising generating the ordered set of rules based on training data.

73. (Currently Amended) The medium of claim 71, each first ~~ad~~item comprises at least information about a user, and a web page currently being browsed by the user, and each second ~~ad~~item comprises an ad.

74. (Currently Amended) The medium of claim 71, generating the ordered set of rules comprises:

determining at least one significant correlation between a plurality of binary features of the training data and a plurality of activations of second ~~ad~~item of the training data;

determining a second ~~ad~~item and at least one binary feature providing a largest activation;

generating a rule based on the second ~~ad~~item and the at least one binary feature providing the largest activation;

removing records from the training data matching the rule generated; and,

repeating to generate another, lower-ordered rule while at least one significant correlation still exists.

75. (Currently Amended) A machine-readable medium having instructions stored thereon for execution by a processor to perform a method comprising:

determining at least one significant correlation between a plurality of binary features of ~~the~~ training data and a plurality of activations of ~~ad~~an item from training data;

determining an ad and at least one binary feature providing a largest activation, each rule accounting for at least a quota for the ~~ad~~item;

generating a rule based on the ad and the at least one binary feature providing the largest activation;

removing records from the training data matching the rule generated; and,

repeating to generate another, lower-ordered rule while at least one significant correlation still exists.

76. (Cancelled)